DOCUMENT RESUME

ED 045 354 SE 009 319

TITLE	The Community School Site, A Laboratory for Learning.
INSTITUTION	Soil Conservation Service (USDA), Lincoln, Nebraska. Midwest Regional Technical Service Center.
PUB DATE	69
NOTE	29p.
EDRS PRICE	EDRS Price MF-$0.25 HC-$1.55
DESCRIPTORS	Conservation Education, *Educational Facilities, Educational Parks, *Environmental Education, Nature Centers, *Outdoor Education, *Site Development

ABSTRACT

Included are several papers presenting ideas for developing outdoor land laboratories. Included are procedures used in developing outdoor laboratories as educational laboratories, community and school uses of the facilities, landscaping, and various natural science, mathematics and art uses. Sources of help in initiating and maintaining the school site are also identified. (BB)

EDO 45354

The Community School Site

A LABORATORY FOR LEARNING

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

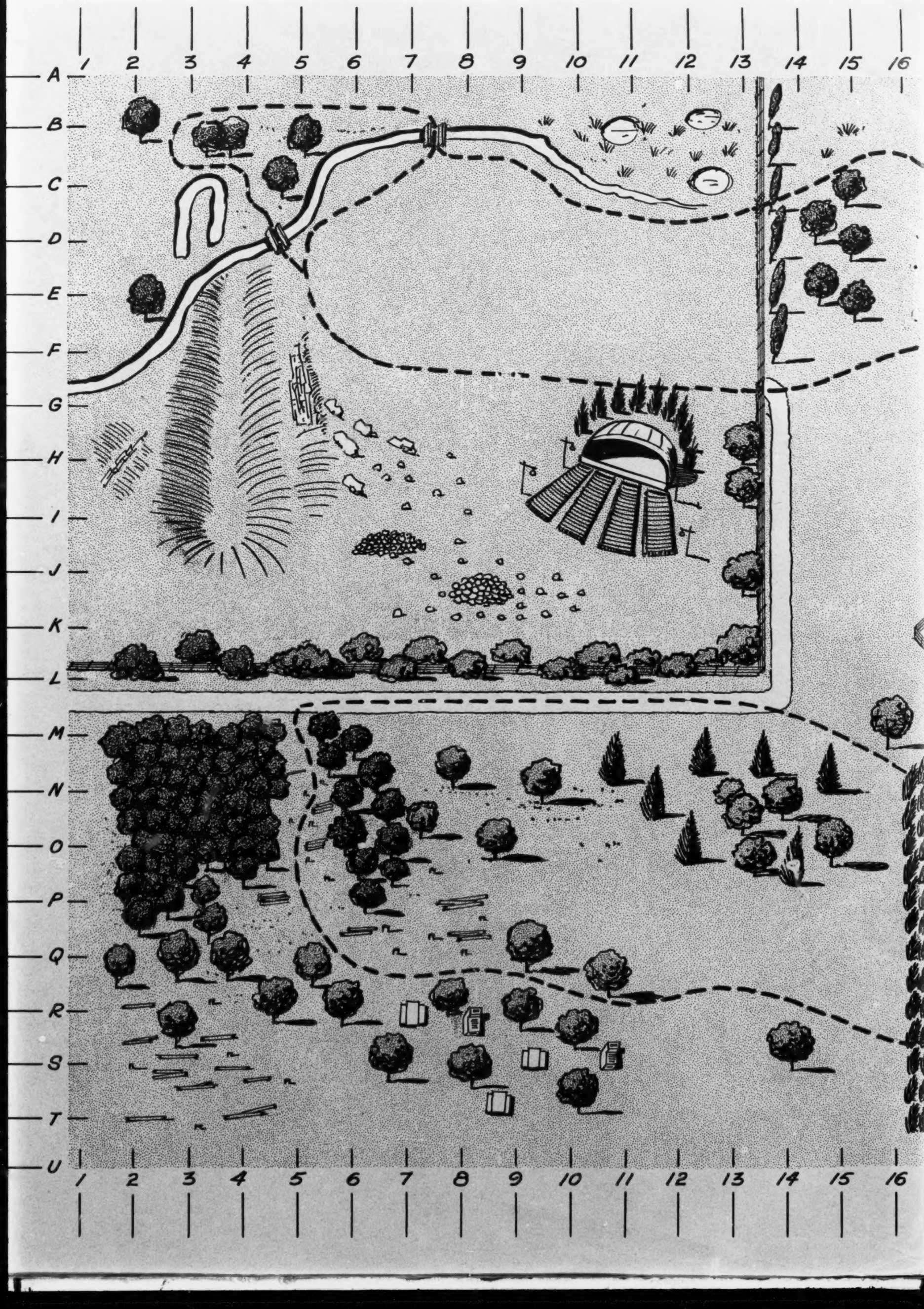
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

This packet was originally published as Bulletin No. 314 by the Michigan Department of Education in 1965. Ideas and guidance were furnished by the Michigan State Committee on Conservation Education. Artwork is by Charles Lanigan, Midland (Michigan) Public Schools and Felix Summers, illustrator, Soil Conservation Service, Lincoln, Nebraska. We are indebted to the Michigan Department of Education for permission to reproduce this material.

USDA, Soil Conservation Service
Midwest Regional Technical Service Center
134 South 12th Street
Lincoln, Nebraska 68508

SE 009 319

USDA-SCS-LINCOLN, NEBR. 1969


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
T
U

ED0 45354

PROCEDURE OUTLINE FOR SCHOOL SITE
OR
OUTDOOR LABORATORY DEVELOPMENT

1. Establish a School Site or Outdoor Laboratory Committee. Pick key working staff members with key administrators and local resource people to establish a development policy in line with the educational philosophy of the school. Delegate authority, set goals, secure administrative sanction and support.

2. Material - Collect all available printed material on site development and set up a working file. Keep records by photograph, report, and news clippings.

3. Resource people - Involve all available resource-person help of a local nature. Sportsmens' clubs, Womens' clubs, Cooperative Extension, P.T.A.'s, agency personnel, etc.

4. Join the local Soil Conservation District - This costs no money and places your land under no obligation. It does enable the district conservationist to offer his technical assistance and the aid of the local 'District'. He will provide a land-use plan, soil map and an aerial photo (extra large sizes can be obtained).

5. Map and inventory your entire site and any land that may come into school ownership in the future. Record contour lines, cover types and distribution, drainage, ponds, rock outcroppings, swales and base features (roads, fences, buildings, etc.).

6. Prepare a plan - A detailed, step-by-step plan is essential for the orderly development of the school site. Duties should be spelled out, budgets established, and educational specifications drawn up for the plan.

7. Promote and publicize - Publicity will help sell the 'new concept' to those who resist because they are not informed.

Bibliography

A Check List on Better Uses for School Sites. May 5, 1963, Michigan Department of Public Instruction., Lansing.

USDA-SCS-LINCOLN, NEBR. 1969

ELEMENTS OF SPECIFICATIONS FOR DEVELOPING A SCHOOL SITE
AS AN EDUCATIONAL LABORATORY

SAMPLE SPECIFICATIONS

Five to ten per cent of our school site will be enclosed. Wise planning of the balance of the space will result in economical laboratories at relatively low cost.

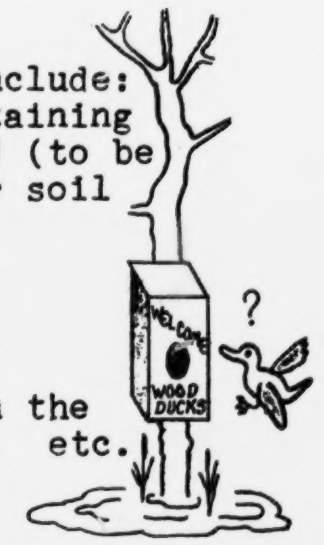
A. STATE the relationship of site to the teaching and learning philosophy of the school; e.g.:

We, of the Deer Acres Community, believe that wise planning on our school site should result in low cost outdoor teaching spaces. Teaching and learning can take place effectively on occasional days away from the enclosure of the classroom. The parking lot beside the school, practice football field, oval track and a clump of bushes will provide worthwhile experiences. Natural ampitheaters, grouping of trees in semi-circular fashion, stream or pond-side benches, and other semi-defined areas can provide natural and effective learning "rooms". These spaces should be located near and within normal sight of school buildings.

B. TELL what subject areas of the school can use the site as laboratories.

Teachers in the natural sciences, social science, art and mathematics, as well as civic groups and clubs will utilize the outdoor laboratory for instruction and pleasure.

C. ENUMERATE kinds of spaces needed. These are in addition to traditional sports and play fields.



General outdoor spaces to be provided in our school should include: nature trails (to be developed over a period of years), maintaining present grove of old trees at the east side of the site, pond (to be used in studying water life), sand hill (to provide space for soil profile study), area for cultivating plants, etc.

D. SUGGEST specific kinds of teaching tools to be constructed or planned for future development.

Space should be provided for development of teaching tools in the following areas: a. bog habitat c. garden spot e. etc.
b. keyed plantations d. picnic sites

E. PROVIDE source materials and lists of school sites to be visited by the landscape planner.

The arcnitect is encouraged to study the brochures available in the school and public libraries on school site development. Other sources of materials include: Michigan Department of Conservation, Soil Conservation Service, U.S. Forest Service, etc. Schools which have provided some outdoor laboratory facilities include: Coldwater Public School, Gwinn Public School, and Ann Arbor Public School.

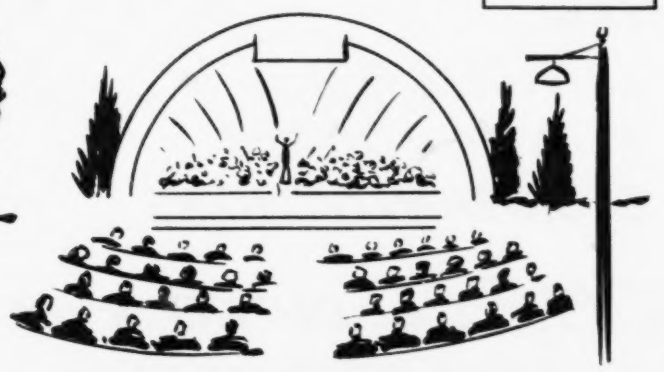
USDA-SCS-LINCOLN, NEBR. 1969

COMMUNITY AND SCHOOL USES OF NATURAL RESOURCES

SEE MAP
S-9aH-11

WIND TO STOP

WATER TO CONTROL



MUSIC TO HEAR

GAMES TO PLAY

SPACE TO RELAX IN

TREES TO RAISE

CLEANLINESS TO LEARN

FOOD TO PREPARE

WATER LIFE TO ATTEND

TREES TO IDENTIFY

LEAVES TO IDENTIFY

BIRDS TO SEE

SLOPES TO SLIDE AND PLAY ON

ANIMALS TO FEED

YEAR-AROUND COMMUNITY USE--BEAUTY WITH PURPOSE

USDA-SCS-LINCOLN, NEBR. 1969

MANY USES - SCHOOL AND COMMUNITY

WHO
1. FAMILIES
2. INDIVIDUALS
3. ORGANIZATIONS

HOME EC. OUTDOOR MEALS
1. BALANCED MEALS
2. COOKING TECHNIQUES

NATURE STUDY
1. LEAF PRINTS
2. LEAF IDENTIFICATION
3. TREES
4. WILDFLOWERS

CONSERVATION
1. WATER
2. SOIL EROSION
3. WIND EROSION
4. WILD LIFE

ART
1. POSTERS AND SIGNS
2. PHOTOGRAPHY

SHOPWORK
1. BUILD BIRD HOUSES
2. BUILD BIRD BATHS

MUSIC ENJOYMENT
1. VOCAL
2. INSTRUMENTAL

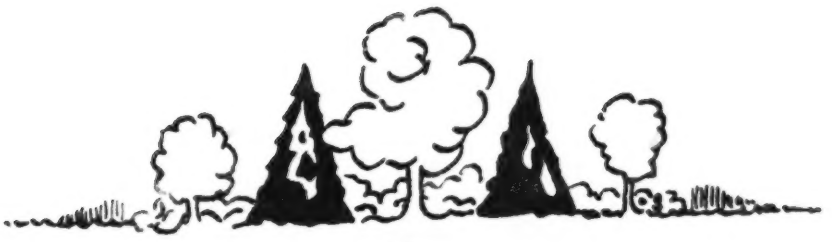
RECREATION
1. WALKING
2. BASEBALL
3. BADMINTON
4. TENNIS
5. SHUFFLEBOARD
6. SLEDDING & SKATING
7. ICE FISHING

CITIZENSHIP 1. PRIDE IN COMMUNITY 2. NO LITTERING

BIBLIOGRAPHY

1. CONSERVATION FOR CAMP AND CLASSROOM, ROBT. O'BALE BURGESS PUBLISHING CO., 1962
2. THE WORLD BOOK, N-5433-9
3. OUTDOOR MEALS, 4H LEADERS' GUIDE, NO. 355F2, M.S.U. COOPERATIVE EXTENSION SERVICE, EAST LANSING, MICH.
4. AUDUBON NATURE BULLETIN, 1130 FIFTH AVE., NEW YORK 28, NEW YORK
5. NATURE CONSERVANCY NEWS, THE NATURE CONSERVANCY, 2039 K. ST. N.W., WASHINGTON 6, D.C.
6. SOIL CONSERVATION AT HOME, U.S. DEPT OF AGRIC., SOIL CONSERVATION SERVICE, AGRICULTURE INF. BUL. . 244,

SEE MAP
D-30



NATURAL AREAS

ALL NATURAL AREAS SHOULD REMAIN UNDISTURBED

ALTERATION OF SUCH AREAS SHOULD TAKE PLACE ONLY AFTER ADEQUATE STUDY AND EVALUATION

EACH AREA HAS IMMEDIATE VALUE AS A LABORATORY IN WHICH CHILDREN CAN OBSERVE STAGES OF SUCCESSION IN PLANT GROWTH AND ANIMAL POPULATIONS

WHAT IS THIS THING CALLED SUCCESSION ?

SUCCESSION IS THE NATURAL CHANGE THAT OCCURS IN VEGETATION OVER A PERIOD OF TIME AS VEGETATIVE TYPES CHANGE ANIMAL SPECIES ALSO CHANGE —

VARIOUS STAGES OF SUCCESSION MIGHT BE FOUND ON YOUR SCHOOL SITE !!

BUILD YOUR SCHOOLS TO FIT THE SITES

OPEN FIELD | SHRUB | FOREST | BARE GROUND

0836-000-LINCOLN, NEBR. 1968

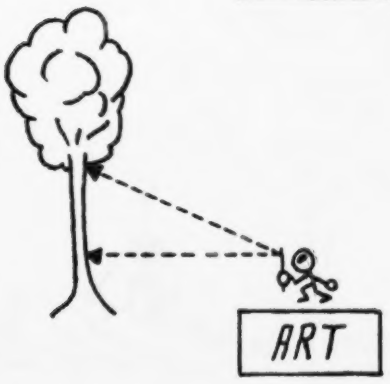
NATURAL WAYS TO USE NATURAL AREAS

SCIENCE

1. FOOD CHAINS
2. LIFE HISTORIES
3. PLANT AND ANIMAL SUCCESSION ~ ECOLOGY
4. SOIL AND WATER SCIENCE

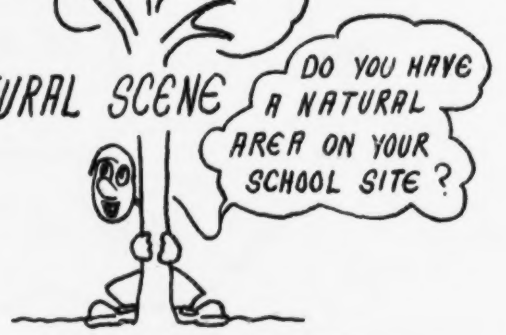
MATH

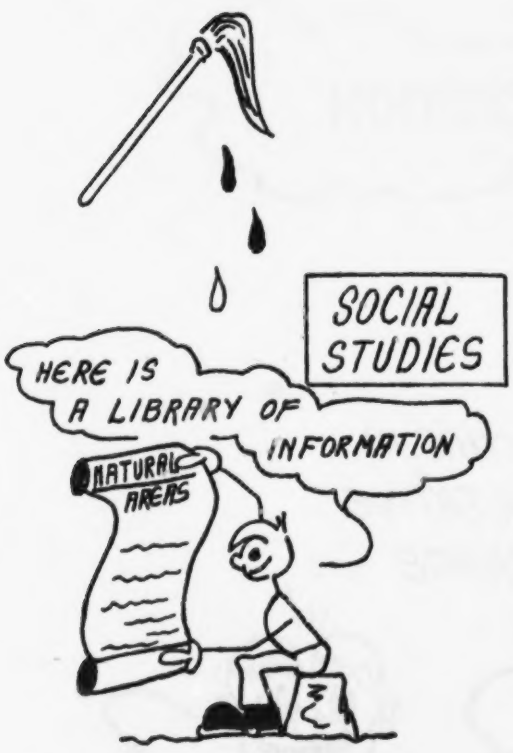
1. DETERMINING HEIGHT AND DIAMETER OF TREES
2. DETERMINING BOARD FEET OF LUMBER IN TREES
3. SAMPLING - RATIO
4. SURVEYING



ART

1. APPRECIATION FOR THE NATURAL SCENE
2. FALL COLORATION
3. DESIGN
4. SKETCHING





SOCIAL STUDIES

1. LOGGING IN MICHIGAN
2. LAND USE HISTORY— LAND DESCRIPTION
3. WATERSHED STUDY IN LAND USE
4. DRAINAGE SYSTEMS

BIBLIOGRAPHY

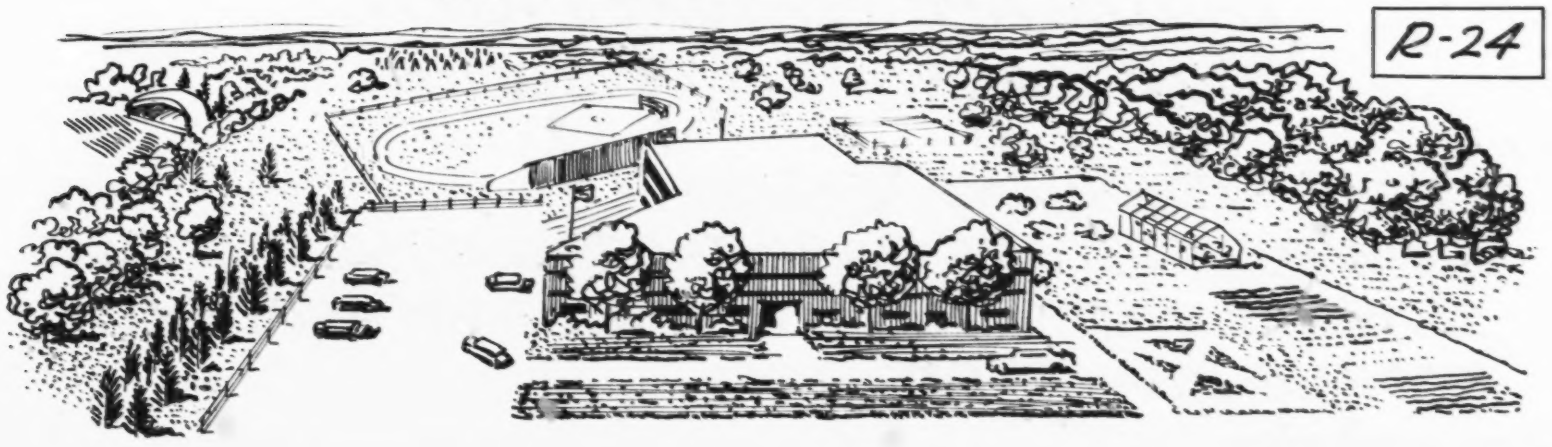
BROWN AND MOUSER ; TECHNIQUES FOR TEACHING CONSERVATION EDUCATION; BURGESS PUBLISHING COMPANY ; MINNEAPOLIS, MINNESOTA

WEAVER , OUTDOOR LABORATORIES ; INTERSTATE PRINTERS AND PUBLISHERS ; DANVILLE, ILLINOIS

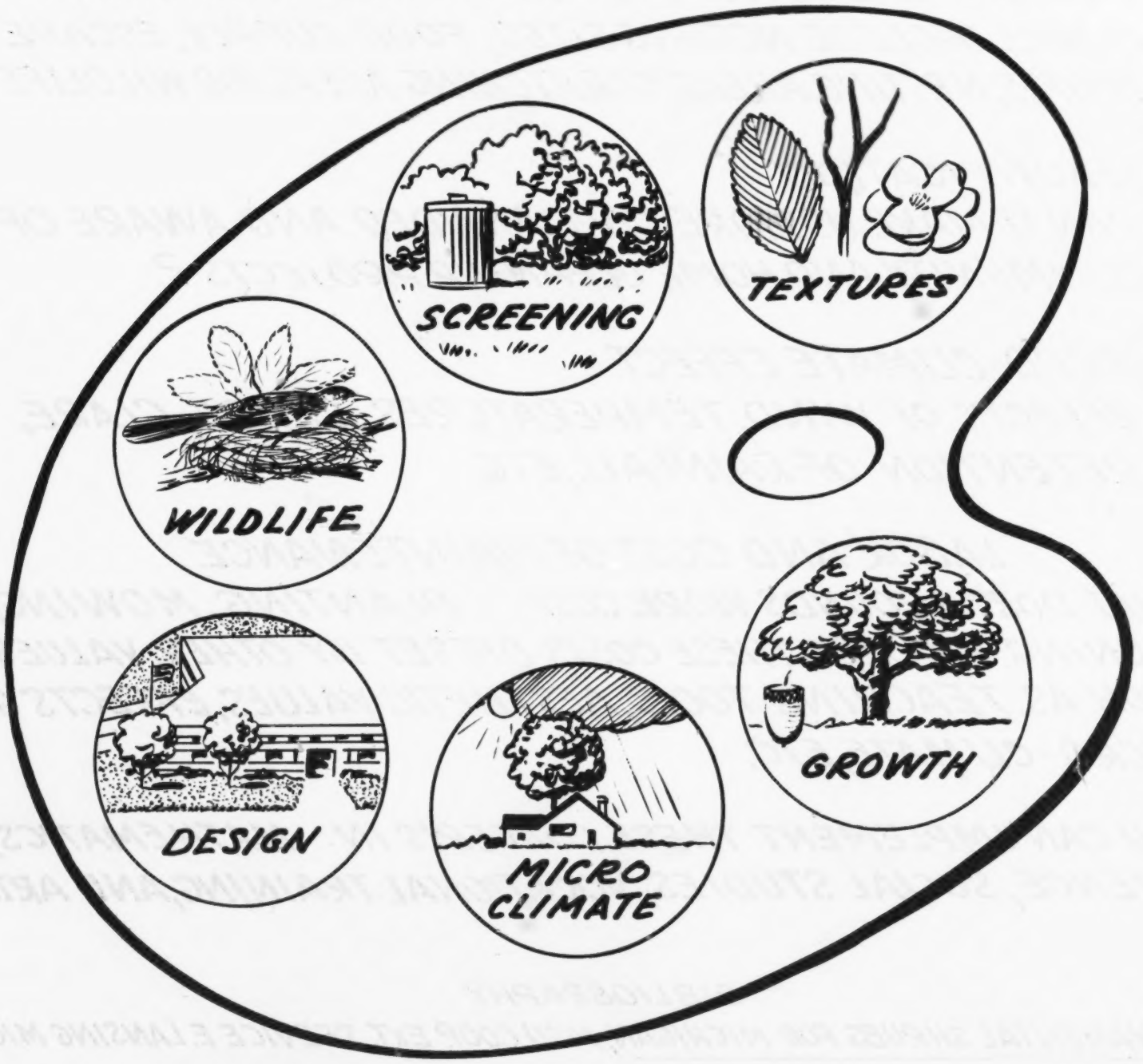
LANDSCAPING

SEE MAP

R-24



CAN BE DONE ON A MULTIPLE USE BASIS



USDA-SCS-LINCOLN, NEBR. 1969

LANDSCAPE FEATURES TO FIT YOUR TEACHING CURRICULUM

IN THE

1. STUDY OF COLOR AND TEXTURES

FLOWERS, FOLIAGE, BARK, TWIGS, DURING THE FOUR SEASONS. WINTER AND SUMMER FORM AND DESIGN PROVIDE CONTRASTS.

IN MAINTAINING

2. WILDLIFE COVER AND FOOD

LANDSCAPING IS NOT JUST THE FOUNDATION PLANTINGS. IT WILL INCLUDE NESTING SITES, FOOD SUPPLY, ESCAPE ROUTES, NESTING AREAS, SCRATCHING AREAS, FOR WILDLIFE.

FOR

3. BEAUTIFICATION

CAN IT MAKE US MORE CIVIC MINDED AND AWARE OF COMMUNITY AND HOME CLEAN-UP PROJECTS?

FOR

4. MICRO-CLIMATE EFFECT

EFFECTS OF WIND, TEMPERATURES, SHADE, GLARE, RETENTION OF RAINFALL, ETC.

LABOR AND COST OF MAINTENANCE

WHAT DOES GROUNDS WORK COST- - PLANTING, MOWING, PRUNING ETC? ARE THESE COSTS OFFSET BY OTHER VALUES SUCH AS TEACHING TOOLS, AESTHETIC VALUES, EFFECTS OF MICRO-CLIMATE, ETC.

YOU CAN IMPLEMENT THESE CONCEPTS IN: MATHEMATICS, SCIENCE, SOCIAL STUDIES, VOCATIONAL TRAINING, AND ART.

BIBLIOGRAPHY

ORNAMENTAL SHRUBS FOR MICHIGAN, M.S.U. COOP. EXT. SERVICE E. LANSING MICH.

WILDLIFE HABITAT

SEE MAP

C-5

ALL WILDLIFE DEPENDS ON FOOD, WATER, AND SHELTER FOR SURVIVAL

FOOD	WATER	SHELTER
WILD FRUITS	WATERSHED LAKES	WINDBREAKS
WEED SEEDS	DRAINAGE DITCHES	HEDGES
NUTS, GRAINS	PONDS	FENCE ROWS
OTHER ANIMALS	STREAMS	BRUSH PILES
GREEN PLANTS	SPRINGS	HOLLOW TREES

WILDLIFE HABITAT IS PERMANENT, INEXPENSIVE, AND IT CAN BE A PART OF ANY SCHOOL SITE DEVELOPMENT

SUGGESTED ACTIVITIES

COMMUNITY GROUPS

BOY SCOUTS, GIRL SCOUTS,
4-H, AUDUBON, ETC.

A - ANIMAL TRACKS
B - STALKING OF ANIMALS
C - MAPPING WILDLIFE HABITAT
D - SPECIES COUNT

MATHEMATICS

COVER MAPPING
WILDLIFE SURVEY

SCIENCE

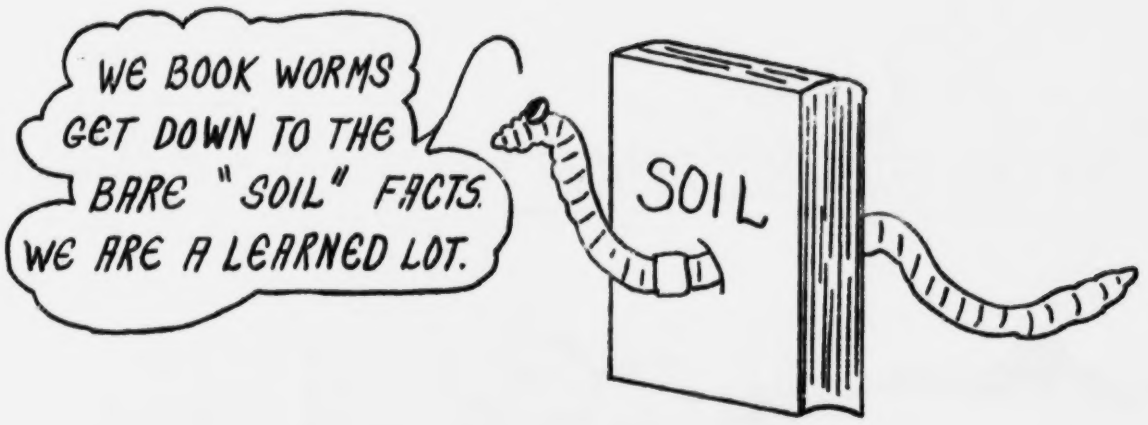
- SOIL AND PLANT GROWTH
- PLANT & ANIMAL IDENTIFICATION
- SEED COLLECTIONS - FOOD
- LIFE HISTORIES AND CYCLES OF ANIMALS

SOCIAL STUDIES

NATURAL RESOURCE MANAGEMENT
PLANT AND ANIMAL ECOLOGY -
A COMMUNITY CONCEPT

BIBLIOGRAPHY

1. GUIDE TO TEACHING CONSERVATION RESOURCE - USE IN MICHIGAN
MICHIGAN DEPARTMENT OF PUBLIC INSTRUCTION, LANSING, MICHIGAN
2. WILDLIFE CONSERVATION, SUGGESTED PROJECTS FOR CLASSROOM, LABORATORY OR FIELD TRIP - MICHIGAN DEPARTMENT OF CONSERVATION, LANSING, MICHIGAN.
3. AN OUTLINE FOR TEACHING CONSERVATION IN ELEMENTARY SCHOOLS
4. MORE WILDLIFE THROUGH SOIL AND WATER CONSERVATION
- 3 & 4 OBTAINED FROM LOCAL OFFICE OF U.S. SOIL CONSERVATION SERVICE



"THERE IS A LOT TO KNOW ABOUT THIS STUFF"

SCIENCE

1. PLANT GROWTH - SOIL STUDIES
2. pH ANALYSIS (TOO ACID ; TOO BASIC ; JUST RIGHT)
3. CHEMICAL AND PHYSICAL BREAKDOWN OF SOIL FORMING MATERIALS
4. SOIL ECOLOGY (INTERRELATIONSHIP OF SOIL TO ALL SITE FACTORS)

MATH

1. PERCENT - (PLANTS ? ANIMALS ? MINERALS ? WATER ? AIR ?)
2. RATIO AND PROPORTION
3. SAMPLING (LEADS TO HELPFUL SOIL ANALYSIS)
4. GRAPHS

SOCIAL STUDIES

1. SOIL TYPES AND ECONOMICS OF AN AREA
2. SOIL MISUSE AND POVERTY
3. LAND USE AND PROGRESS
4. ZONING

GOOD SOIL — PROSPEROUS PEOPLE

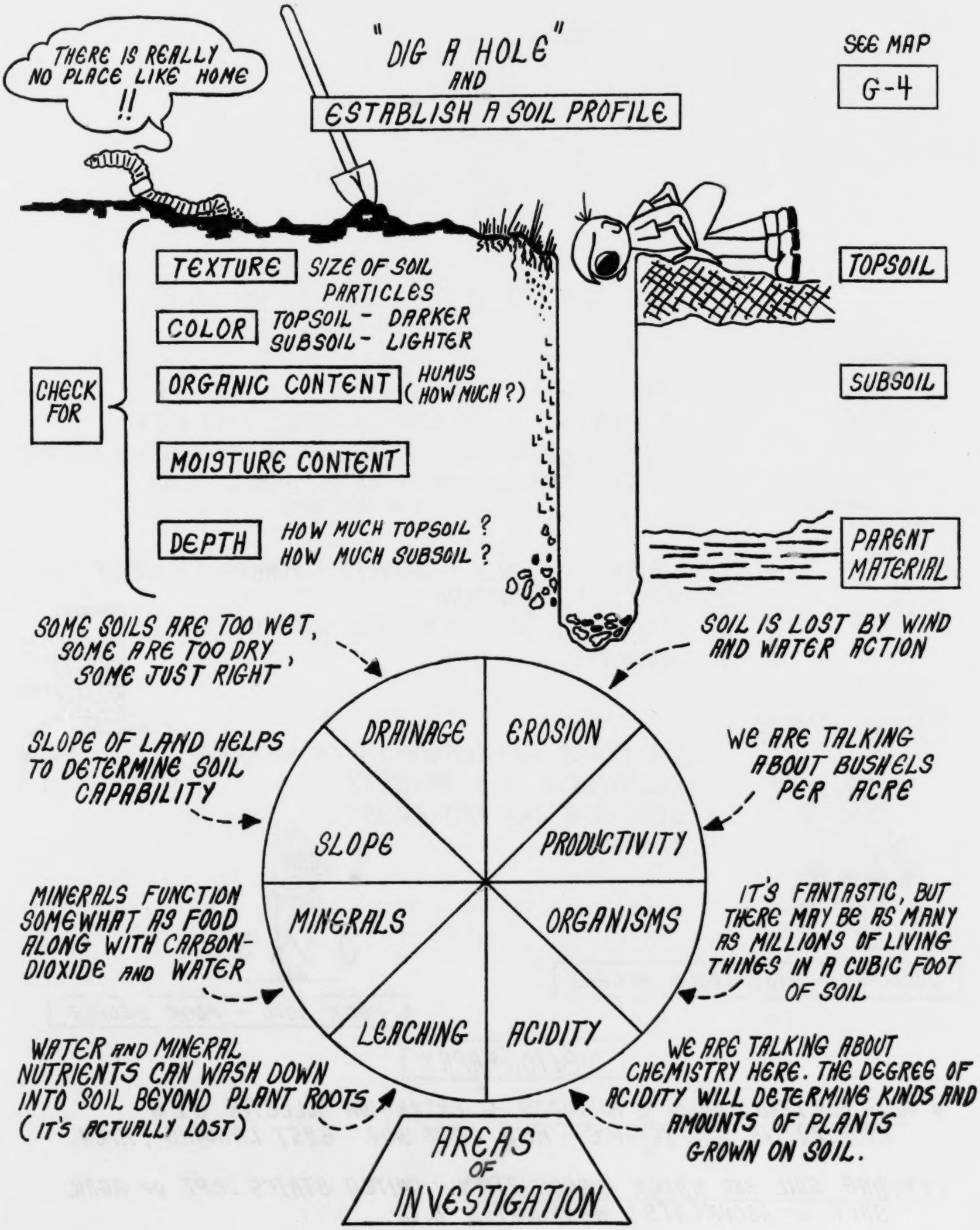
POOR SOIL — POOR PEOPLE

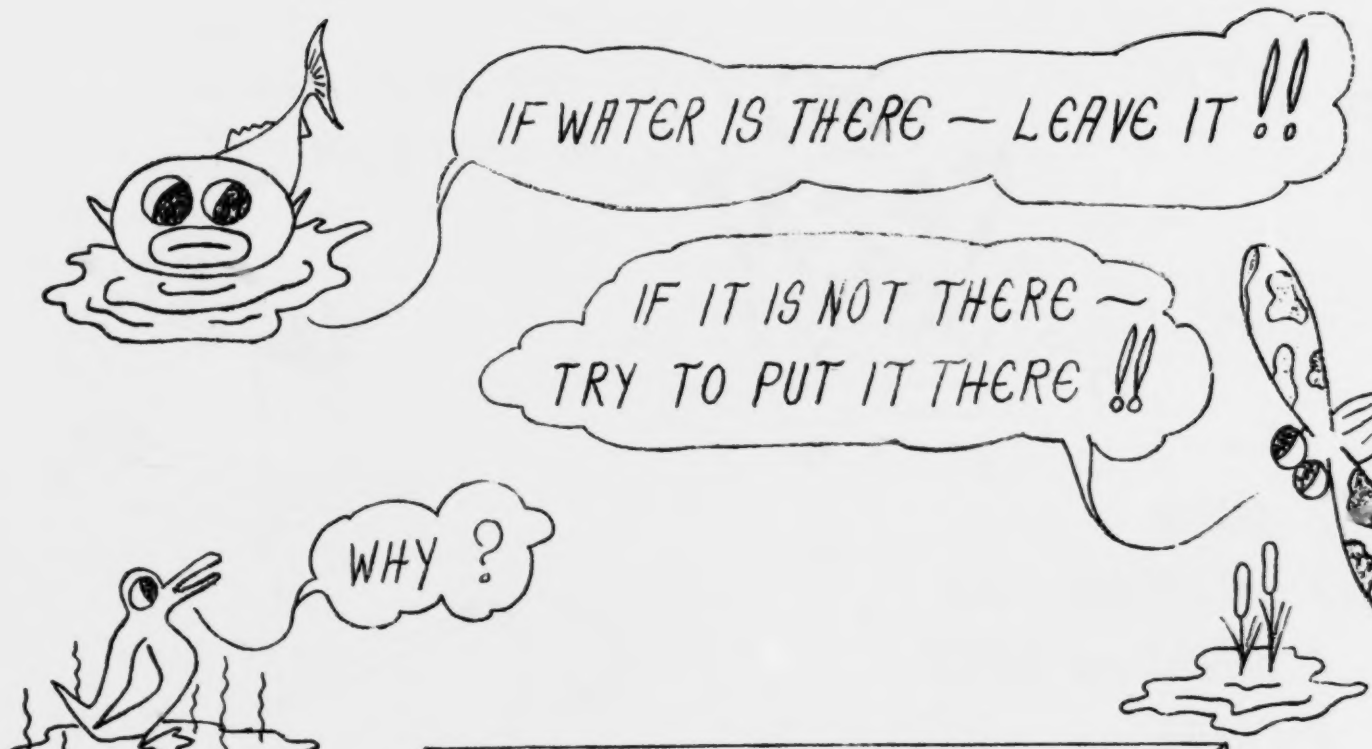
BIBLIOGRAPHY

A GUIDE FOR LAND JUDGING IN MICHIGAN ~ EXTENSION BULLETIN 326
COOPERATIVE EXT. SERVICE ~ MICH. STATE UNIV. EAST LANSING, MICH.

TEACHING SOIL AND WATER CONSERVATION ~ UNITED STATES DEPT. OF AGRIC.
SUPT. OF DOCUMENTS, WASHINGTON D.C.

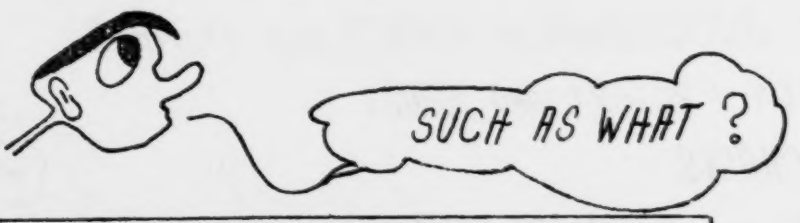
USDA-SCS-LINCOLN, NEBR. 1969


THERE IS REALLY NO PLACE LIKE HOME !!
"DIG A HOLE" AND ESTABLISH A SOIL PROFILE
SEE MAP G-4
CHECK FOR
TEXTURE
SIZE OF SOIL PARTICLES
COLOR
TOPSOIL - DARKER
SUBSOIL - LIGHTER
ORGANIC CONTENT
HUMUS (HOW MUCH?)
MOISTURE CONTENT
DEPTH
HOW MUCH TOPSOIL ?
HOW MUCH SUBSOIL ?
TOPSOIL
SUBSOIL
PARENT MATERIAL
SOME SOILS ARE TOO WET, SOME ARE TOO DRY, SOME JUST RIGHT
SOIL IS LOST BY WIND AND WATER ACTION
SLOPE OF LAND HELPS TO DETERMINE SOIL CAPABILITY
WE ARE TALKING ABOUT BUSHELS PER ACRE
DRAINAGE
EROSION
SLOPE
PRODUCTIVITY
MINERALS FUNCTION SOMEWHAT AS FOOD ALONG WITH CARBON-DIOXIDE AND WATER
IT'S FANTASTIC, BUT THERE MAY BE AS MANY AS MILLIONS OF LIVING THINGS IN A CUBIC FOOT OF SOIL
MINERALS
ORGANISMS
LEACHING
ACIDITY
WATER AND MINERAL NUTRIENTS CAN WASH DOWN INTO SOIL BEYOND PLANT ROOTS (IT'S ACTUALLY LOST)
WE ARE TALKING ABOUT CHEMISTRY HERE. THE DEGREE OF ACIDITY WILL DETERMINE KINDS AND AMOUNTS OF PLANTS GROWN ON SOIL.
AREAS OF INVESTIGATION



SEE MAP
B-12

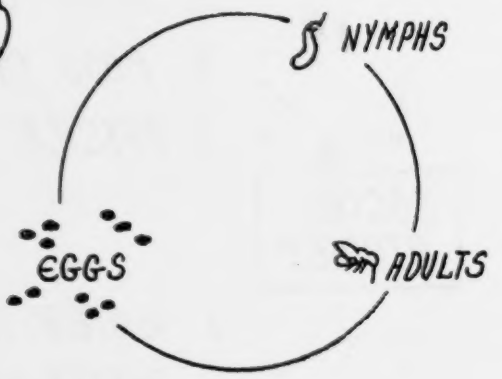
WATER OF ANY SORT IS A HABITAT OF SPECIAL CHARACTERISTICS, BE IT RIVER, POND, LAKE, PUDDLE OR SPRING. THIS HABITAT AND ITS ENVIRONMENTAL FACTORS OFFER A GREAT DEPTH OF LEARNING OPPORTUNITIES



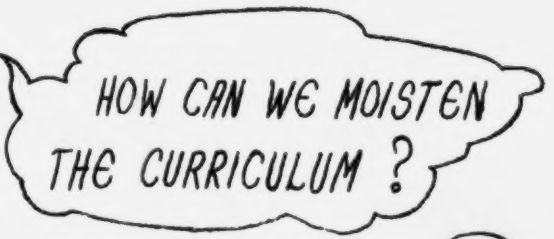
SUCH AS THE LIFE CYCLES OF CERTAIN INSECTS

AND

- STUDIES OF AQUATIC PLANTS AND ANIMALS
- AQUATIC SUCCESSION
- FACTORY FOR PRODUCTION OF AQUATIC ORGANISMS
- WATERSHED UNDERSTANDINGS
- WATER CYCLE FACTORS
- ECONOMICS OF LAND USE



USDA-SCS-LINCOLN, NEBR. 1969

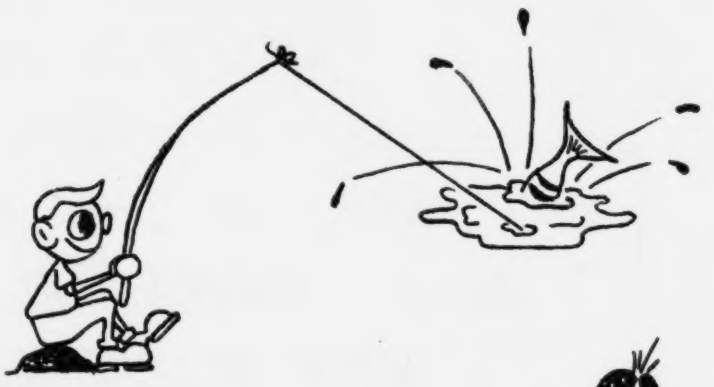


ART

1. DESIGN
2. THE NATURAL LOOK
3. SHADES AND TONES
4. COLOR

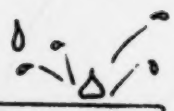
MATH

1. DENSITY CALCULATIONS
2. FLOTATION STATISTICS
3. VOLUME AND CAPACITY
4. SAMPLING



SCIENCE

1. WATER SUCCESSION OF PLANTS AND ANIMALS
2. PLANKTON FACTORY AND STUDY
3. FOOD CHAINS
4. PHYSICAL AND CHEMICAL ANALYSIS OF WATER



SOCIAL STUDIES

1. WATER SUPPLY
2. WATERSHED MANAGEMENT
3. RECREATIONAL VALUE
4. WATER CYCLE AND MAN

BIBLIOGRAPHY

HUMPHREYS, CLIFF, WATER IDEAS FOR BUSY TEACHERS,
WELLS HALL, UNIT E, MICHIGAN STATE UNIVERSITY, EAST LANSING, MICH.

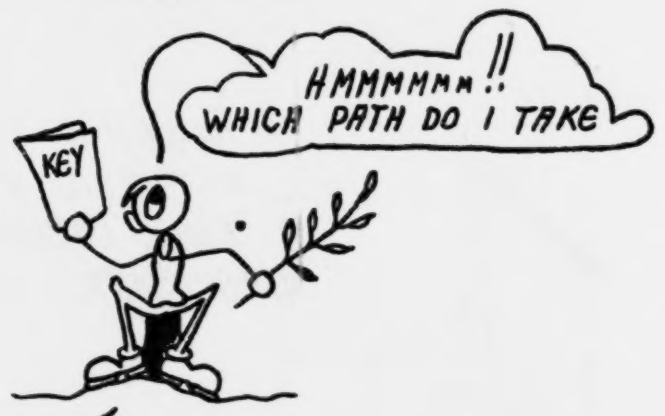
KEYED PLANTATIONS

SEE MAP
N-13

PINES
HEMLOCK BALSAM
SPRUCES
RED CEDAR WHITE CEDAR
TAMARACK
LEAVES IN GROUPS
FLAT NEEDLES
ANGLED NEEDLES
LEAVES IN CLUSTERS
LEAVES- SINGLE
LEAVES- NEEDLE SHAPED
LEAVES NOT NEEDLE SHAPED
CONIFEROUS
DECIDUOUS THIS WAY
START HERE

A KEYED PLANTATION CONSISTS OF A COLLECTION OF RELATED PLANTS

THE SPECIMENS ARE PLANTED IN SUCH POSITIONS THAT WHEN APPROACHED FROM THE RIGHT ENTRY THEY PRESENT TO THE VIEWER A SUCCESSION OF COMPARISONS.



SIMPLE LEAVES
COMPOUND LEAVES

HERE IS A REAL "KEY" TO LEARNING

THE CONCEPT OF KEYING IS MADE MEANINGFUL THROUGH DIRECT EXPERIENCE AND APPLICATION.

HABITAT CAN BE VARIED TO FIT THE SPECIFIC REQUIREMENTS OF THE SPECIMENS USED.

HABITATS CAN BE CLASSIFIED RIGHT ALONG WITH THE PLANT SPECIMENS.

PLANTS HAVE SCIENTIFIC NAMES WHICH ARE UNDERSTOOD UNIVERSALLY BY LEARNED PEOPLE

USDA-SCS-LINCOLN, NEBR. 1969

SCIENCE

1. KEYING - TAXONOMY OF PLANT LIFE
2. ECOLOGY - INTERRELATIONSHIPS IN NATURE
3. TAXONOMY OF HABITATS

MATH

1. SURVEYING AND MAPPING
2. ARITHMETIC AND GEOMETRIC PROGRESSIONS
3. CUMULATIVE GROWTH DATA

ART

1. DESIGN ~ TREE SHAPES, LEAF SHAPE
2. ESTHETIC APPRECIATION FOR NATURE
3. FALL COLORING - WATER COLORS
4. SEASONAL SCENES

SOCIAL STUDIES

1. WOOD INDUSTRIES OF MICHIGAN
2. NATURAL RESOURCE MANAGEMENT (TIMBER)

BIBLIOGRAPHY

BELCHER, ROBERT, EDUCATIONAL SPECIFICATIONS FOR KEYED PLANTATIONS ON SCHOOL SITES, BIOLOGY DEPT., EASTERN MICH. UNIV.

WHAT SCHOOL SITE DOESN'T HAVE CRACKS ?

SEE MAP

J-30

WHERE

LOOK AROUND YOU!
SIDEWALKS, PARKING LOTS, TENNIS COURTS
BUILDINGS, DRIED SOIL, ETC.

YOU MUST BE "CRACKED"!
WHAT USE ARE CRACKS
IN TEACHING ?

COME HERE; LET'S
TAKE A CLOSER LOOK!

CERTAIN PLANTS AND ANIMALS
LIVE WITHIN THESE CRACKS.

THEY ARE FOUND HERE BECAUSE THE
ENVIRONMENT IS DIFFERENT THAN THE
ADJACENT PAVEMENT OR SOIL.

CRACKS FORM, DUE TO THE
EXPANSION AND CONTRACTION OF
THE PAVEMENT AND SOIL.

THESE CRACKS WILL CHANGE
SHAPE AND SIZE WITH THE SEASONS

SO WHAT !! HOW CAN CRACKS BE
USED IN TEACHING

CRACKS

USDA-SCS-LINCOLN, NEBR. 1969

MATH

MEASURE CHANGES IN CRACK WIDTH AND DEPTH OVER A PERIOD OF TIME

OBSERVE GEOMETRIC PATTERNS MADE BY CRACKS

CALCULATE AREAS PRODUCED BY CRACKS

ART

PATTERNS IN CRACK DEVELOPMENT

SOCIAL STUDIES

CRACKS IN BUILDINGS AND PAVEMENTS HAVE AN ECONOMIC EFFECT ON PEOPLE

SCIENCE

SAMPLE PLANT AND ANIMAL LIFE LIVING WITHIN CRACKS. COMPARE IN TERMS OF TYPES AND NEEDS OF ORGANISMS THAT INHABIT ADJACENT AREAS

DETERMINE THE ENVIRONMENT OF CRACKS WITH REGARD TO TEMPERATURE, LIGHT INTENSITY AND MOISTURE CONTENT.

STUDY THE SEQUENCE OF SOIL DEVELOPMENT AS RELATED TO CRACKS IN ROCKS AND PAVEMENTS

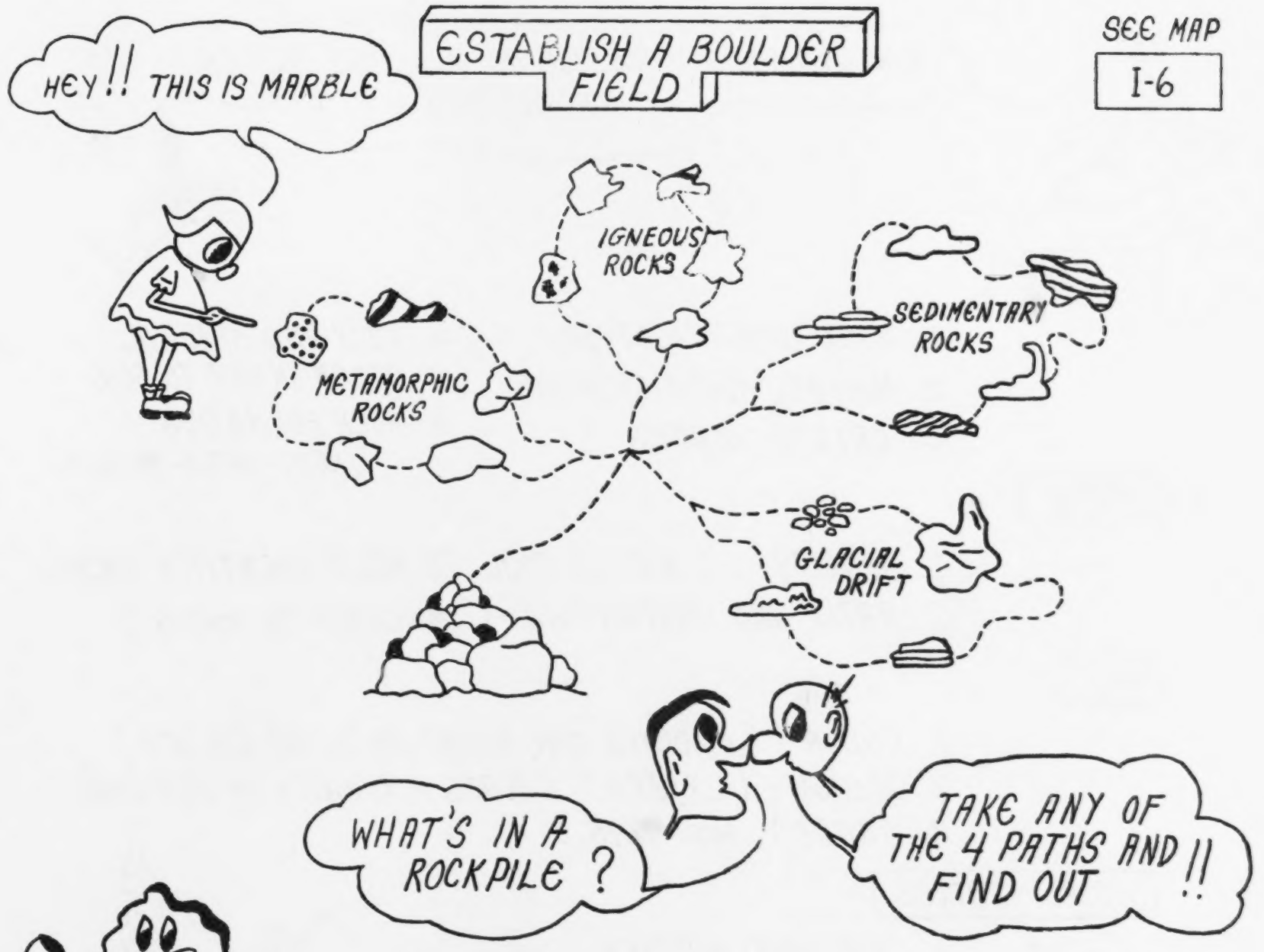
BIBLIOGRAPHY

TEACHING SOIL AND WATER CONSERVATION. U.S.D.A., WASHINGTON 25, D.C.

THE WEB OF LIFE. STORER, JOHN. DEVON–ADAIR PUBL. CO., NEW YORK, NEW YORK.

ESTABLISH A BOULDER FIELD

SEE MAP
I-6

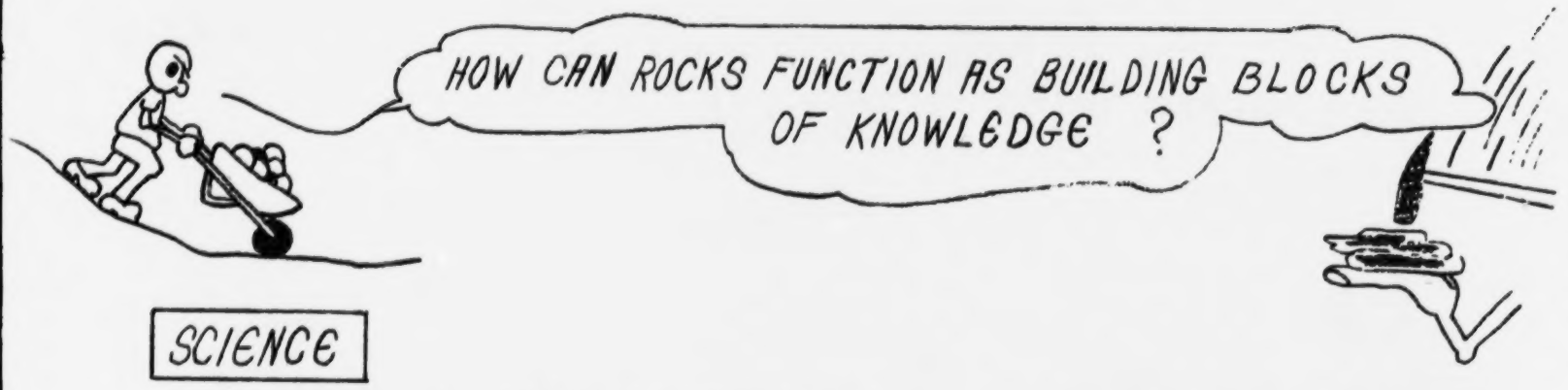

HEY!! THIS IS MARBLE
IGNEOUS ROCKS
METAMORPHIC ROCKS
SEDIMENTARY ROCKS
GLACIAL DRIFT
WHAT'S IN A ROCKPILE ?
TAKE ANY OF THE 4 PATHS AND FIND OUT !!
ACTUALLY, WE ROCKS DO A LOT OF TALKING
THERE ARE MANY WAYS TO GO ABOUT IDENTIFYING ROCKS

" WE TELL SOMETHING ABOUT THE GEOLOGIC HISTORY OF THE SURFACE OF OUR EARTH "

SUCH AS :

1. GLACIAL ACTIVITY
2. MOUNTAIN BUILDING
3. MINERAL RESOURCES
4. LAKES AND OCEANS
5. LIFE OF THE PAST
6. EARTH MOVEMENTS

USDA-SCS-LINCOLN, NEBR. 1969



SCIENCE

1. ROCK IDENTIFICATION
2. MINERAL IDENTIFICATION
3. CRYSTALIZATION
4. ROCK AND MINERAL RELATIONSHIP TO SOIL
5. ROCK FORMATION
   [HEAT-WATER-PRESSURE]

MATH

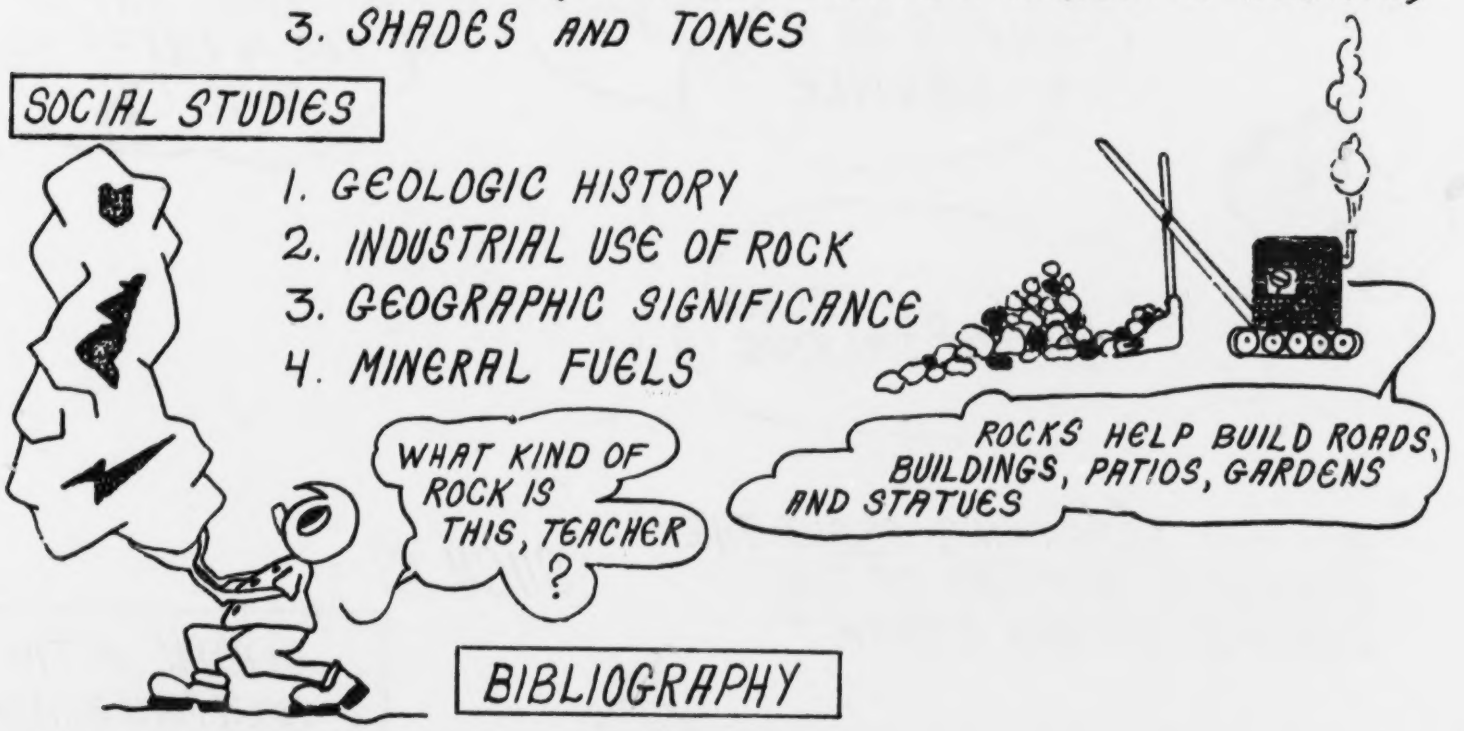
1. DENSITY - (A GOOD TOOL TO HELP IDENTIFY ROCKS)
2. RATIO AND PROPORTION - (MINERALS TO ROCKS)

ART

1. COLOR - (MINERALS GIVE ROCKS PECULIAR COLORS)
2. DESIGN - (CRYSTALS CREATE A VARIETY OF DESIGNS)
3. SHADES AND TONES

SOCIAL STUDIES

1. GEOLOGIC HISTORY
2. INDUSTRIAL USE OF ROCK
3. GEOGRAPHIC SIGNIFICANCE
4. MINERAL FUELS



BIBLIOGRAPHY

POINDEXTER, O.F., ROCKS AND MINERALS OF MICHIGAN, GEOLOGICAL SURVEY DIVISION, DEPARTMENT OF CONSERVATION, MICHIGAN.

ZIM, HERBERT S., ROCKS AND MINERALS, GOLDEN NATURE GUIDE, SIMON AND SCHUSTER · NEW YORK.

MATHEMATICS-SCIENCE

USE OF SIDEWALKS, PARKING AREAS, DRIVEWAYS, BLACK TOP PLAY AREAS TO VISUALIZE SCIENCE AND MATHEMATICAL CONCEPTS.

MATHEMATICS

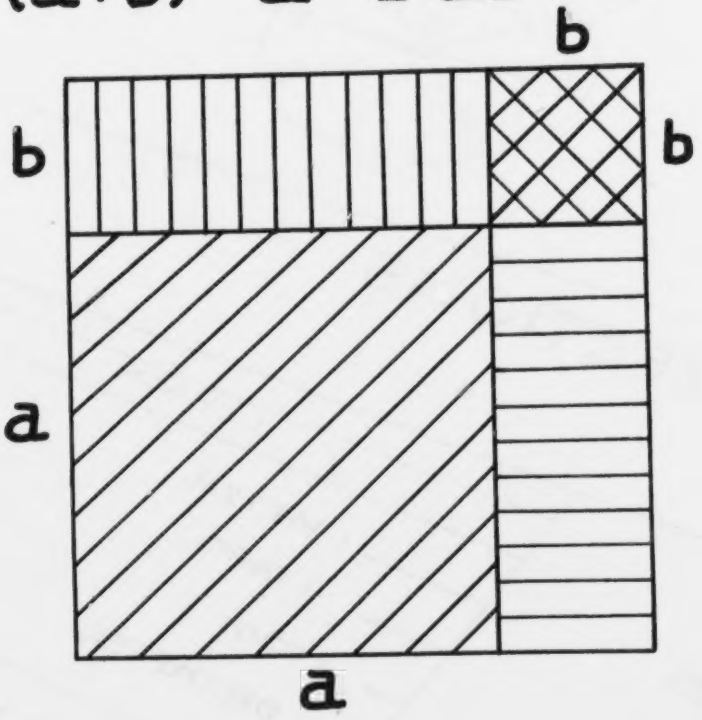
AREA MEASURE
LINEAR MEASURE
ALGEBRAIC EQUATIONS
ANGLES

SCIENCE

ASTRONOMY
WEATHER
LINEAR MEASURE
ANGLES

ALGEBRAIC EQUATIONS

$(a+b)^2 = a^2 + 2ab + b^2$

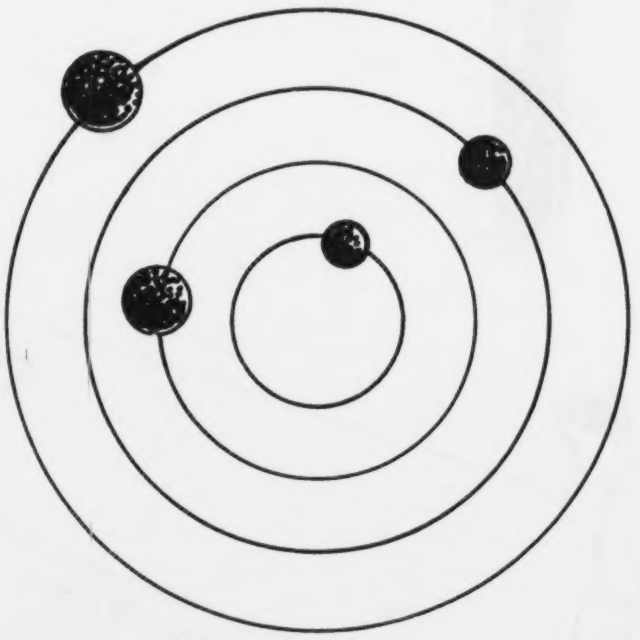


SOLAR SYSTEMS

(EARTH = 1", JUPITER = 11" ETC.)

DISTANCES

(2" = 93 MILLION MILES)

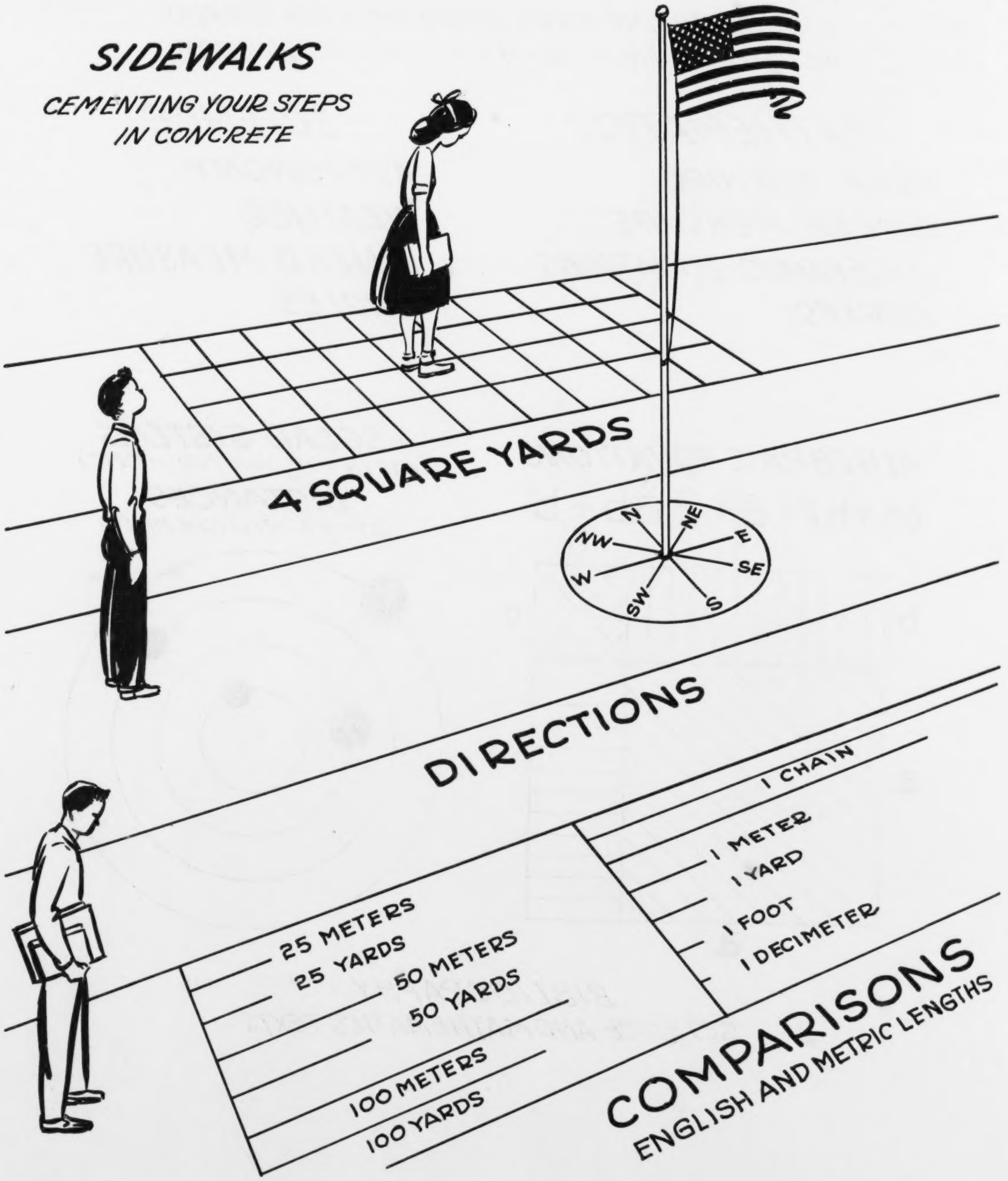


BIBLIOGRAPHY

SCIENCE AND MATHEMATICS TEXTS

A WALK THROUGH LENGTHS, SHAPES, DIRECTIONS, AND MEASUREMENTS

SEE MAP P-22



USDA-SCS-LINCOLN, NEBR. 1969

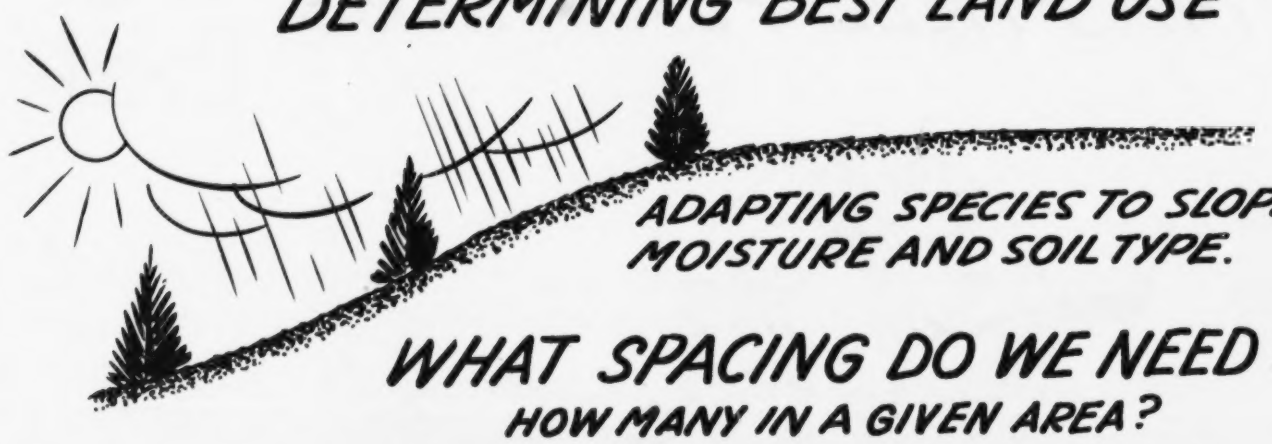
CHRISTMAS TREE PLANTINGS

SEE MAP C-20

MOST SCHOOLS CAN DEVELOP A SMALL TREE FARM. IT CAN BE PLANTED, MANAGED, AND HARVESTED BY STUDENTS AS PART OF THEIR CLASSROOM INSTRUCTION.

USDA-SCS-LINCOLN, NEBR. 1969

DETERMINING BEST LAND USE



ADAPTING SPECIES TO SLOPE, CLIMATE, MOISTURE AND SOIL TYPE.

WHAT SPACING DO WE NEED?

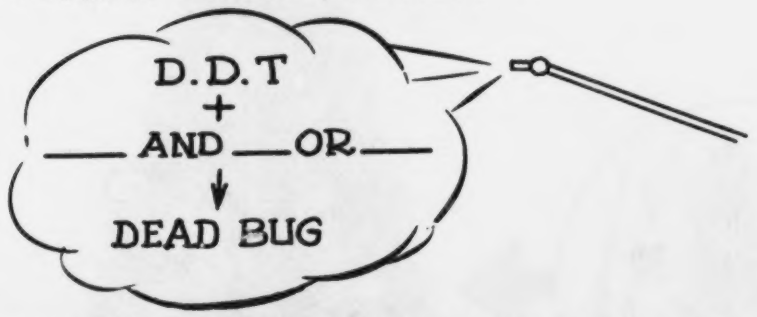
HOW MANY IN A GIVEN AREA?

WHAT SHAPE IS MOST ATTRACTIVE?

WHAT ANGLE?

HOW DOES IT FIT INTO OUR HOME OR SCHOOL ROOM?
WHAT NATURAL SHAPES DO CERTAIN VARIETIES HAVE AND TO WHAT EXTENT DO WE HAVE TO SHAPE THE TREE?

WHAT CHEMICALS CONTROL WHAT AND WHEN?



BOOKKEEPING POSSIBILITIES

RECORDS	LABOR 10 HRS.
200 TREES @ $16/1000	$3.20
PLANTING	1965
HARVEST	- 1971
SPRAY MATERIALS	$2.46

MANAGEMENT-ECONOMICS

PLANTING TIME

SPRAYING TIME →
PRUNING TIME →
HARVESTING TIME →

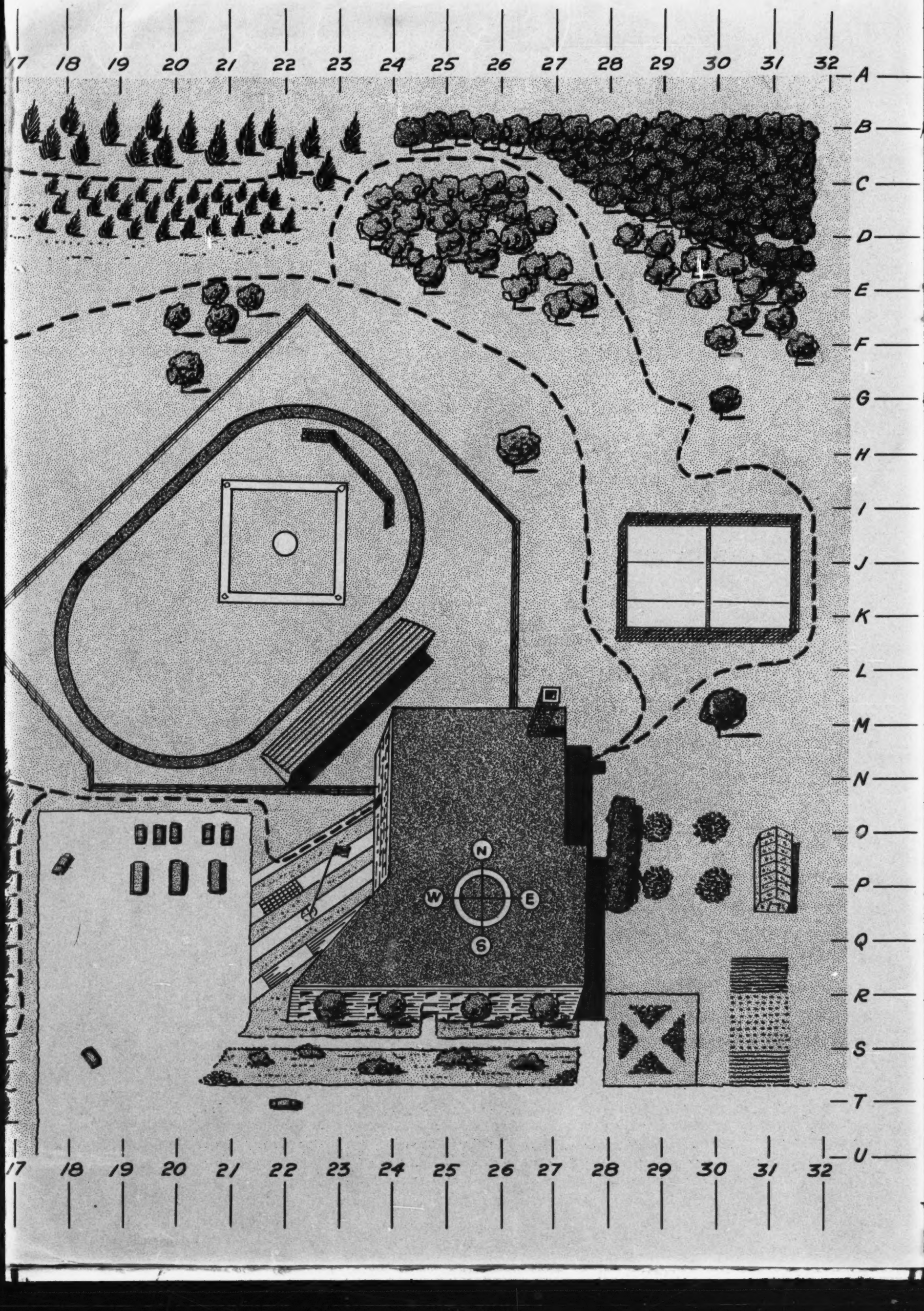
APRIL	MAY	JULY
1 to 17	1 to 12	16 to 25

BIBLIOGRAPHY

1-SELECTING SPECIES OF CHRISTMAS TREES FOR PLANTING IN MICHIGAN
2-CHRISTMAS TREE INSECT CONTROL. 3-SHEARING AND SHAPING CHRISTMAS TREES.
M.S.U. COOP EXTENSION SERVICE, EAST LANSING, MICHIGAN, FOR ALL THREE.

SOIL CONSERVATION SERVICE
U. S. DEPARTMENT OF AGRICULTURE

NEEDS	POSSIBLE ASSISTANCE: (1) Direct personnel help	(2) Use of land & equipment	(3) Advice and materials
1. SITE PLANNING (location of units, buildings, overall program use of property; may include appraisal of present property and facilities).	Soil Conservation Service, USDA	-	Surveys--Soils and Engineering--necessary to insure most effective use of land consistent with erosion control and best land use.
2. MAPS/SURVEYS -topographical maps -aerial surveys -soil/water surveys	Soil Conservation Service, USDA	-	Maps and surveys needed for effective planning to prevent soil erosion.
3. UTILITIES -roads -parking area -truck trails	Soil Conservation Service, USDA	-	Layouts for effective erosion control based on survey information (Item 2).
-sewage disposal -waste disposal			Soil survey information.
-water (lakes, pools, for activities)			Soils & topographic surveys; standards & specifications; supervision of construction.
4. MAINTENANCE -land management (clearing/planting) -conservation projects	Soil Conservation Service, USDA	-	Planning, assisting, possibly planting stock; guidance.
-road erosion -beach/shore erosion			Technical assistance--possible source of grasses, trees, and shrubs as needed for erosion control


17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
T
U
N
W
E
S

"DID YOU REALIZE . . . .

That Your School Site. . . .

. . . can be an EFFECTIVE teaching device,

. . . can be an INEXPENSIVE aid to the curriculum,

. . . will provide EXPERIENCES children will long remember?"

The map inside is hypothetical. It attempts to include man-made conditions existing on most school grounds. Each of the enclosed leaflets has a map reference number in the upper right corner. When using a particular leaflet use the map grid and reference number to find the existing condition on the map. The leaflet provides information on the development and use of the condition.